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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 19

Application Number: 09/497,865
Filing Date: February 04, 2000
Appellant(s): CHANG ET AL.

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For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 10/02/02.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying that there are no related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

No amendment after final has been filed. However, the Appellants filed an IDS on October 2, 2002. The information disclosure statement has been placed of record in the file but has not been considered by the examiner since the petition lacked the required fee and proper certification. Additionally, a drawing correction was filed July 31, 2002 and was approved by the Examiner.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that claims 1-5 and 7-37 do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

6,151,496	RICHARDS et al	11/2000
6,034,634	KARLSSON et al	3/2000
5,973,647	BARRETT et al	10/1999
5,077,562	CHANG et al	12/1991
3,720,953	AJIOKA	3/1973

SUZUKI, Ryutaro et al, "Mobile TDM/TDMA System with Active Array Antenna" Global Telecommunications Conf, (December 1991), pp.1569-1573, vol. 3.

CHIBA, Isamu et al, "Digital Beam Forming (DBF) Antenna System for Mobile Communications" IEEE AES Systems Magazine, (September 1997), pp. 31-41.

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 4, 5, 7-9, 11, 13-18, 21-22 and 25-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over either one of Richards et al or Karlsson et al in view of either one of Chiba et al or Suzuki et al and further in view of Chang et al.

Each of Richards et al and Karlsson et al teach the use of a satellite terminal antenna that combines mechanical scanning in the azimuth direction and electronic one-dimensional scanning in the elevation direction wherein the antenna is rotated mechanically such that multiple satellites

are within the elevation scanning plane of the antenna. Multiple beams are taught and shown for the purpose of simultaneously tracking the multiple satellites for providing soft handover. Each of Richards et al and Karlsson et al differ from the claimed subject matter since the claimed digital beam former is not specified; Richards et al describe the use of an active electronically scanned array without specifying the use of analog or digital processing/beam forming, while Karlsson et al merely describe a phased array antenna. The progress in digital device technologies has led to the use of DBF antennas for use in commercial communication system, most suitably, mobile radio systems, as taught by Chiba et al (see "Introduction", e.g.) and Suzuki et al (see " I. Introduction" and "III. Digital Beam Forming Antennas", e.g.). The advantageous features of DBF for use in phased array antennas as a replacement for analog beam forming are clearly identified therein. Chang et al describe a specific digital beam forming technique that is efficient and utilizes fewer ADCs than conventional digital beam formers, resulting in lower power requirements, weight, complexity and cost; Figure 2 exemplifies the technique, including the claimed "multiplexor" 180, "analog to digital converter" 198, and "circuitry for forming multiple digital beam forms" 130. A digital receiver is inherent.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify either one of Richards et al or Karlsson et al by using/substituting a digital beam former for the electronically scanned antenna beams in view of the progress in such direction in the art as shown by either one of Chiba et al or Suzuki et al for the reasons set forth above. Moreover, it would have been further obvious to one having ordinary skill in the art to modify the digital beam former by using the DBF technique expressed by Chang et al so as to provide a lightweight and less costly device for a user terminal. The combination of references

make obvious the claimed subject matter wherein the specifics of the claimed digital beam former are explicitly shown by the Chang et al reference. The dependent features are either shown or made obvious by the combination of references.

Claims 2, 3, 10, 12, 19, 20 and 23-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined prior art set forth above as applied to claims above, and further in view of Ajioka and Barrett et al.

Either one of (Richards et al or Karlsson et al) in view of either one of (Chiba et al or Suzuki et al) and Chang et al teach a satellite communication terminal having mechanical azimuth scanning and electronic elevation scanning using digital beam forming techniques that allow for soft handover as set forth above. The combined prior art fails to specify the electronically scanned antenna array as comprising cross-slotted waveguides, each including a septum. Ajioka teach the conventionality of a cross-slotted waveguide having a septum for use in a phased array antenna. Barrett et al teach the conventionality of a slotted antenna array for use in a satellite communication terminal wherein azimuth scanning can be achieved mechanically and elevation scanning can be achieved electronically. In view of the conventionality of cross-slotted waveguides in scanning antenna arrays as shown by each of Ajioika and Barrett et al, it would have been obvious to one having ordinary skill in the art to modify the scanning antenna arrays of either one of Richards et al or Karlsson et al by substituting a cross-slotted waveguide array. Ajioka further shows the use of a septum for controlling characteristics of the antenna output.

*(11) **Response to Argument***

ISSUE 1

Appellants argue the patentability of the claims over Richards et al and Karlsson et al separately without any consideration to the secondary references. Appellants argue that the combination is based upon improper hindsight reconstruction since there is nothing in the references which would suggest the combination. Appellants argue independently each of the claims in the appeal with merely a recitation of a portion of the claim language and an allegation that such a feature is not shown by the references. The appellants' arguments are substantially repetitive of arguments set forth in the response to the Office Action filed 2/1/02.

In response to appellant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). The Appellants' arguments in the Brief, as well as the arguments presented in the prosecution history, are completely devoid of any mention of the secondary references; the Appellants' arguments merely allege that the two primary references to Richards et al and Karlsson et al fail to suggest a digital beam former. Thus, the Appellants have failed to provide any evidence of record to show that the combination of references fails to suggest the claimed subject matter as set forth in the rejection.

In response to appellant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the

time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In the same vein, in response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, each of Richards et al and Karlsson et al is directed to a terminal antenna that provides electronic and mechanical scanning so as to provide soft handover in a satellite communication system. Each suggests the formation of multiple beams so as to simultaneously communicate with multiple satellites at the timing of handover. Chiba et al and Suzuki et al are each directed to the use of digital beam forming for providing satellite communications as well as the advantages achieved therewith; thus, each of Chiba et al and Suzuki et al are analogous art with respect to Richards et al and Karlsson et al as well as provide a suggestion to use digital beam forming. Lastly, Chang et al are directed to a digital beam former for a communications antenna array; thus, this reference is directed commonly to the electronic communication antenna arrays of each of Richards et al and Karlsson et al as well as the digital beam forming of each of Chiba et al and Suzuki et al and therefore is analogous art. Likewise, Chang et al suggest the motivation to use in order to minimize the number of ADCs. It can been seen that the combination of references is proper and logically presented within the scope of the references and the skill of the artisan.

The appellants specify various features which are argued not to be shown, although, Appellants simply argue that the features are not shown by the primary references without addressing any of the secondary references.

On page 4, par. 3, of the Brief, Appellants allege the failure of the references to show a digital beam former, multiplexer, and A/D converter; Chang et al disclose this claimed feature. As each of the references is directed to a communications terminal a receiver is necessarily inherent.

On page 5, par. 1, Appellants allege that Richards et al fail to disclose any details regarding beam forming ; again Chang et al disclose the claimed digital beefier.

On page 5, par. 2, Appellants allege that Richards et al fail to teach a rotating plate ; it is maintained that the mechanical movement along the azimuth axis results in rotation of the antenna plate 13 about the azimuth axis and is no different from the claimed rotation. The claim language does not distinguish therefrom.

On page 6, par. 1, Appellants allege that Karlsson et al fail to disclose any details about digital beam forming and allegedly teach away from the use of digital beam forming; Chang et al teach the claimed digital beam former.

On page 6, par. 1, Appellants allege that Karlsson et al do not teach the radiation elements converting the received wave signals into information streams to determine the positions of the satellites and therefore claims 1, 7 and 21 are allowable. The Appellants fail to argue the claim language as none of the cited claims recite such a feature.

On page 6, par. 1, Appellants allege that Karlsson et al do not teach a rotating plate. This is contrary to the showing of Karlsson et al who shows rotation 24 for rotating plate 12 as well as antenna 19 about the azimuth axis.

On page 6, par. 3 through page 7, Appellants allege that neither Richardson et al nor Karlsson et al teach rotating an antenna so as to align the major axis of the antennas with the wavefront of a plurality of wave signals. This is contradictory to the teachings of both Richards et al and Karlsson et al each of which mechanically rotates the antenna about an azimuth axis (providing a 1-dimensional mechanical scan) and each of which aligns the antenna so that a 1-dimensional, electronic, elevational scan is provided wherein the satellites are in the same plane.

On page 7, par. 1, Appellants allege that neither Richards et al nor Karlsson et al teach consolidating a plurality of wave signals into a single bit stream; Chang et al teach this feature.

On page 7, par. 2, Appellants allege that neither Richards et al nor Karlsson et al teach a plurality of elongated radiation elements for electronically scanning. With regard to the use of "elongated radiating elements" as claimed in claims 21 and 37, Richards et al disclose the use of an electronically scanned antenna and show, in Figure 1, a plurality of elongated, parallel lines making up the antenna. Moreover, any conventional electronically scannable elements are deemed to be suggested by Richards et al, therefore suggesting any conventional slot type array, for example, which would further meet the scope of the claims. The only antenna types that would not read on "an elongated radiating element" would be a circular patch or circular aperture.

On page 7, par. 3, Appellants allege that the prior art fails to teach radiation elements on a rotating plate wherein the elements are parallel to one another. Again this contradictory to the references, specifically, see Richards et al wherein the antenna plate is configured with parallel antenna elements.

On page 8, par. 1, Appellants allege that Karlsson et al fail to show locking on to a second satellite before locking off a first satellite. Figure 5 of Karlsson et al suggests the use of a two beam system wherein the antenna beams are aligned within the same scan angle so as to capture both the going satellite and the coming satellite simultaneously. Thus, the Appellants argument is not persuasive.

Appellants separately argue each of the dependent claims with a statement including a portion of the claim language as well as a statement that the references fail to suggest such. As the Office has set forth a prima facie case of obviousness, it is incumbent upon the Appellant to show how the prior art references in combination fail to meet the claim limitations. The Appellants' arguments amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the combined references. The allegations that the DBF of the combined references would not suggest or make obvious the use of FFTs, that the arrays may be utilized on mobiles, that the satellites may be equitatorial, that the antenna plate is circular as opposed to rectangular, that the analog signal is converted to a digital bit stream, etc. are unsupported and contrary to the teachings of the combined references and the scope of the combined references to the skilled artisan. See for example Chiba et al (Fig.2), see Karlsson et al (col. 2, lines 53-60), see Chiba et al (Fig. 9), see Chang et al (Fig. 2).

ISSUE 2

Appellants argue that each of claims 2, 3, 10, 12, 19, 20 and 23-24 are allowable for the same reasons given with respect to the independent claims on which they depend. As set forth above, the independent claims are obvious in view of the combined references; the Appellants' statements above are not persuasive. Again the Appellants allege claims 2, 3, 10, 12, 19, 20 and 23-24 to be independently patentable on the basis of mere allegation of the failure of the combined references to suggest parallel, cross-slotted waveguides (2, 19, 23), slotted septum (3, 12, 24), interdigitally spaced slotted waveguides (10, 20). Appellants are completely silent as to why the combination of references with Ajioka and Barrett et al as set forth by the Office is in error and do not suggest the claimed subject matter. Therefore, the Appellants' arguments are not convincing.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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gci
December 9, 2002

Conferees
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